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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/522,576

01/28/2005

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070602-0568

8806

31824 7590 05/12/2008
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EXAMINER

DINH, TIEN QUANG

ART UNIT

PAPER NUMBER

3644

MAIL DATE

DELIVERY MODE

05/12/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/522,576	Applicant(s) PATEL ET AL.	
	Examiner Tien Dinh	Art Unit 3644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 12-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4-6, 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Hosick et al.

Hosick et al teaches a system that provides attitude control. The system has control logic/modules to control the reaction wheel 40 assemblies and gimbaled thruster assemblies 22 during orbit transfers or any other maneuvers as desired that can result in minimal gimbal stepping. The system has processors and software. The maneuver control module has a momentum adjust module and a gimbal module that constantly take into account the operations of the reaction wheel and the thrusters and use first, second, and third output signals to control the spacecrafts. When there is a torque deficit, the system as a whole adjust the reaction wheels and the thrusters so that the correct maneuvering commands are sent to the wheels and the thrusters. See column 7, lines 1-52. See column 9, lines 29-45. See column 10, lines 6-21. See column 11, lines 9-23. In addition, column 9, lines 12-20, teaches that both the momentum wheels and the electric thrusters can both be used to "steer" the spacecraft. Since both the thrusters and the wheels are used to steer the spacecraft, both of these devices determines how each are supposed to act to each other so that the spacecraft can be steered correctly. In other

word, if the thrusters produce a certain amount of thrust that does not have desired amount of thrust, the momentum wheels make up the torque deficit to produce the desired steering.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-6, 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita 6622969 in view of Goodzeit 6481672.

Yamashita discloses a system having control logic/control module (that is part of the parts 8, 6, 9, 4, 5) to control reaction wheel assemblies 7 and control logic/control module to control the thrusters 10 are well known. The system can operate during orbit transfers. The use of reaction wheels and thrusters results in minimal gimbal stepping since they work together. Yamashita is silent on the gimballed thrusters. However, Goodzeit discloses a system having control logic to control gimballed thrusters are well known. See abstract.

It would have been obvious one skilled in the art at the time the invention was made to have used control logic to control gimballed thrusters in Yamashita's system as taught by Goodzeit to allow great maneuverability to the spacecraft.

Re claims 5 and 10, parts 8, 6, 9, 4, 5 have processors and hence software etc.

Re claim 11, the maneuver control module, which is comprised of parts 8, 9, 4, 5, 6, are used to control the maneuvers of the spacecraft. The maneuver control module has a momentum

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adjust module which control the thruster 10 and reaction wheel 7. The second output is the thruster momentum adjusts torque and a third output relating to the integral momentum adjust torque, which is the summation of the thruster output and reaction wheel before it is “pointed” to the satellite dynamics 1. When there is a torque deficit, the gimbal module is sent back to the main control module via elements 16, 19. The reaction wheel control module would then generate the signal to the momentum wheel assemblies to adjust the maneuvers of the spacecraft as desired in part of the reiterations.

In view of the amendment to the claims, the applicant has included the terms “control logic”. Control logic is defined as “s the part of a software architecture that controls what the program will do. This part of the program is also called the **controller**. Before the instruction reaches the control logic it is translated into binary through an instruction decoder or "decode unit".” See www.wikipedia.com. The control logic/control modules are part of the overall computer system that is used to control the operations of the spacecraft. The control logic/control modules have software that are programmed so that the spacecraft operates as designed. This software clearly includes first and second logics that are capable of being configured to control the momentum wheels and the thrusters. The first control logic controls the momentum wheel. When there is a torque deficit associated with the gimbaled thrusters, the first control logic makes up the deficit by controlling the momentum wheels. This is disclosed in column 10, lines 59-67 to column 11. Furthermore, figures 1, 4, 5, and 9 show flow charts that teach that the momentum wheels making up the torque deficit associated with the thrusters.

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Claims 2, 3, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita 6622969 as modified by Goodzeit 6481672 as applied to claims 1 and 6 above, and further in view of Baldwin et al 6870164.

Yamashita 6622969 as modified by Goodzeit 6481672 discloses all claimed parts except for the Hall Current Thrusters. However, Baldwin et al discloses that Hall Current Thrusters are well known in the art.

It would have been obvious to one skilled in the art at the time the invention was made to have used Hall Current Thrusters in Yamashita 6622969's system as modified by Goodzeit 6481672 and as taught by Baldwin et al as a substitution of parts to have a lighter thruster system.

Claims 2, 3, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosick et al 6032904 in view of Baldwin et al 6870164

Hosick et al discloses all claimed parts except for the Hall Current Thrusters. However, Baldwin et al discloses that Hall Current Thrusters are well known in the art.

It would have been obvious to one skilled in the art at the time the invention was made to have used Hall Current Thrusters in Hosick's system as taught by Baldwin et al as a substitution of parts to have a lighter thruster system.

Response to Arguments

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The examiner still maintains “wherein” clause carries no patentable weight. However, the examiner has also pointed out where in the prior arts that torque deficit associated with the thrusters are “made up for” by the momentum wheels. See the rejections above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tien Dinh whose telephone number is 571-272-6899. The examiner can normally be reached on 12-8.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Michael Mansen can be reached on 571-272-6608. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tien Dinh/
Primary Examiner, Art Unit 3644